

Senior Capstone Design

Project: [USDA - Stream Velocity](#)

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Team: [Stream Team](#)

Date: [4/29/2021](#)

Design Validation Plan & Results (DVP&R)

Requirement	Test	Test Subject	Target Date	Result	Recommendation
Probes communicate 100ft away	separate probes by 100ft and test for communication	HC 12 wireless transmitter	10/28/20	Successful Test the probes communicated	
Probes communicate 100ft away with interference	separate probes by 100ft and test for communication with pipe wall inbetween	HC 12 wireless transmitter	10/28/20	Material interference didnt seem to be an issue with communication	
Probes communicate 100ft away	separate probes by 100ft and test for communication	HM 10 (bluetooth) wireless transmitter	11/4/20	Successful Test the probes communicated	
Probes communicate 100ft away with interference	separate probes by 100ft and test for communication with pipe wall inbetween	HM 10 (bluetooth) wireless transmitter	11/4/20	Material interference didnt seem to be an issue with communication	
Pipe is water proof when caps are on.	pour water over tube and ends then dry off and check for internal moisture	Probe container	4/17/21	Water was able to seep through the threading on the 3D printed cap	Add an O-ring to not let the water into the housing
circuit casing is water proof	pour water into the outter tube and make sure no water enters the secondary container	inner circuit container and outter pipe	2/17/21	N/A. We removed the secondary container from the design	
batter life is at least 10hrs in duration	run the system with a timer and periodically check if it has died up to 10 hrs	battery pack	2/17/21	The probes were able to send data continuously overnight with no problems	
the outter pipe must be durable	apply force to outter tube and check for cracking or substantial damage	device handle and container	11/11/20	The PVC should be able to with stand the stresses that it will be put under	
system is capable of transitioning to small stream form	the probe is easily detachable from main handle and easily attachable small stream flag	probe and clips	2/17/21	The extendable handle is removable, which makes for an easy transition to small streams	
data is accurate and reads with a high enough resolution	run old system and new system to compare data	probes	11/11/20	The data ligned up with the old systems and was reading accurately	
probes read simultaionly	insert probes into water and have them communicate their data at the same time	probes and circuit	10/28/20	The probes output simultaioniously	
Retractable wire	try to retract wire with reel system	reel system	4/26/2021	Wire tangled, not succesful	Try dragging the wire vs. winding it up